Appl. No. 10/672,183
Amdt. dated August 29, 2007
Reply to Office Action of July 2, 2007

        This listing of claims replaces all prior versions, and
listings of claims in the instant application:

<u>Listing of Claims:</u>
        1.   (Currently Amended) A method for executing an
obfuscated application program, the method comprising:
            receiving an obfuscated application program, said
    obfuscated application program comprising at least one
    instruction opcode value encoded using one of a
    plurality of instruction set opcode value encoding
    schemes;
            receiving an application program instruction
    corresponding to a current instruction counter value;
            selecting an instruction dispatch table based at
    least on said current instruction counter value; and
            executing said application program instruction
    using said selected instruction dispatch table to
    obtain a reference to an instruction implementation
    method corresponding to <u>an</u>~~the~~ opcode value of ~~the~~ said
    application program instruction.

        2.   (Previously Presented) The method of claim 1,
further comprising:
            determining whether there is another application
    program instruction to be executed;
            advancing said current instruction counter if
    there is another application program instruction to be
    executed; and
            repeating said receiving said application program
    instruction, said selecting and said executing after
    said advancing.

        3.   (Previously Presented) The method of claim 1
wherein said selecting further comprises:
            performing modulo-n arithmetic operation on said
    current instruction counter value, where n is the

number of dispatch tables, each of said dispatch tables
associated with a unique number between 0 and n-1; and
     selecting the instruction dispatch table
associated with the result of said modulo-n arithmetic
operation.

4. (Previously Presented) The method of claim 1
wherein the number of instruction dispatch tables is based
at least on a number of instructions in a method of said
obfuscated application program.

5. (Original) The method of claim 4 wherein said
number of instruction dispatch tables is greater than or
equal to said number of instructions.

6. (Original) The method of claim 5 wherein said
number of instruction dispatch tables equals said number of
instructions.

7. (Previously Presented) The method of claim 1
wherein the number of instruction dispatch tables is based
at least on an amount of available memory.

8. (Previously Presented) A method for application
program obfuscation, the method comprising:
     reading an application program comprising code;
     determining a plurality of dispatch tables
associated with said application program;
     transforming said application program into
application program code configured to utilize said
plurality of dispatch tables during application program
execution to determine the location of instruction
implementation methods to be executed based at least on
using a current instruction counter value to select a
dispatch table in said plurality of dispatch tables for
use with an application program instruction

corresponding to said current instruction counter value; and

  sending said application program code.

9. (Previously Presented) The method of claim 8 wherein said determining further comprises determining the encoding of said plurality of dispatch tables based at least on a relative frequency of instructions in said application program code.

10. (Original) The method of claim 8 wherein said determining further comprises filtering said plurality of dispatch tables to flatten the frequency distribution of instructions over said transformed application program code.

11. (Original) The method of claim 8 wherein

  said method further comprises, after said transforming, applying a cryptographic process to said application program code together with a cryptographic key to create an encrypted obfuscated application program; and

  said sending comprises sending said encrypted obfuscated application program.

12. (Currently Amended) A program storage device readable by a machine, embodying a program of instructions executable by the machine to perform a method for executing an obfuscated application program, the method comprising:

  receiving an obfuscated application program, said obfuscated application program comprising at least one instruction opcode value encoded using one of a plurality of instruction set opcode value encoding schemes;

  receiving an application program instruction corresponding to a current instruction counter value;

  selecting an instruction dispatch table based at least on said current instruction counter value; and

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executing said application program instruction
using said selected instruction dispatch table to
obtain a reference to an instruction implementation
method corresponding to an~the~ opcode value of ~the~ said
application program instruction.

13. (Previously Presented) The program storage device
of claim 12, said method further comprising:
determining whether there is another application
program instruction to be executed;
advancing said current instruction counter if
there is another application program instruction to be
executed; and
repeating said receiving said application program
instruction, said selecting and said executing after
said advancing.

14. (Previously Presented) The program storage device
of claim 12 wherein said selecting further comprises:
performing modulo-n arithmetic operation on said
current instruction counter value, where n is the
number of dispatch tables, each of said dispatch tables
associated with a unique number between 0 and n-1; and
selecting the instruction dispatch table
associated with the result of said modulo-n arithmetic
operation.

15. (Previously Presented) The program storage device
of claim 12 wherein the number of instruction dispatch
tables is based at least on a number of instructions in a
method of said obfuscated application program.

16. (Original) The program storage device of claim 15
wherein said number of instruction dispatch tables is
greater than or equal to said number of instructions.

17.   (Original)   The program storage device of claim 16
wherein said number of instruction dispatch tables equals
said number of instructions.

18.   (Previously Presented)   The program storage device
of claim 12 wherein the number of instruction dispatch
tables is based at least on an amount of available memory.

19.   (Previously Presented)   A program storage device
readable by a machine, embodying a program of instructions
executable by the machine to perform a method for
application program obfuscation, the method comprising:
         reading an application program comprising code;
         determining a plurality of dispatch tables
    associated with said application program;
         transforming said application program into
    application program code configured to utilize said
    plurality of dispatch tables during application program
    execution to determine the location of instruction
    implementation methods to be executed based at least on
    using a current instruction counter value to select a
    dispatch table in said plurality of dispatch tables for
    use with an application program instruction
    corresponding to said current instruction counter
    value; and
         sending said application program code.

20.   (Previously Presented)   The program storage device
of claim 19 wherein said determining further comprises
determining the encoding of said plurality of dispatch
tables based at least on a relative frequency of
instructions in said application program code.

21.   (Original)   The program storage device of claim 19
wherein said determining further comprises filtering said
plurality of dispatch tables to flatten the frequency

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distribution of instructions over said transformed
application program code.

22.   (Original)   The program storage device of claim 19
wherein

said method further comprises, after said
transforming, applying a cryptographic process to said
application program code together with a cryptographic
key to create an encrypted obfuscated application
program; and

said sending comprises sending said encrypted
obfuscated application program.

23.   (Currently Amended)   An apparatus for executing an
obfuscated application program, the apparatus comprising:

means for receiving an obfuscated application
program, said obfuscated application program comprising
at least one instruction opcode value encoded using one
of a plurality of instruction set opcode value encoding
schemes;

means for receiving an application program
instruction corresponding to a current instruction
counter value;

means for selecting an instruction dispatch table
based at least on said current instruction counter
value; and

means for executing said application program
instruction using said selected instruction dispatch
table to obtain a reference to an instruction
implementation method corresponding to an~~the~~ opcode
value of ~~the~~ said application program instruction.

24.   (Previously Presented)   The apparatus of claim 23,
further comprising:

means for determining whether there is another
application program instruction to be executed;

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means for advancing said current instruction counter if there is another application program instruction to be executed; and

     means for repeating said receiving said application program instruction, said selecting and said executing after said advancing.

25.   (Previously Presented)   The apparatus of claim 23 wherein said means for selecting further comprises:

     means for performing modulo-n arithmetic operation on said current instruction counter value, where n is the number of dispatch tables, each of said dispatch tables associated with a unique number between 0 and n-1; and

     means for selecting the instruction dispatch table associated with the result of said modulo-n arithmetic operation.

26.   (Previously Presented)   The apparatus of claim 23 wherein the number of instruction dispatch tables is based at least on a number of instructions in a method of said obfuscated application program.

27.   (Original)   The apparatus of claim 26 wherein said number of instruction dispatch tables is greater than or equal to said number of instructions.

28.   (Original)   The apparatus of claim 27 wherein said number of instruction dispatch tables equals said number of instructions.

29.   (Previously Presented)   The apparatus of claim 23 wherein the number of instruction dispatch tables is based at least on an amount of available memory.

30.   (Previously Presented)   An apparatus for application program obfuscation, the apparatus comprising:

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   a processor; and

   a memory, coupled to said processor, having stored therein computer readable instructions wherein executing said computer readable instructions on said processor provides:

    means for reading an application program comprising code;

    means for determining a plurality of dispatch tables associated with said application program;

    means for transforming said application program into application program code configured to utilize said plurality of dispatch tables during application program execution to determine the location of instruction implementation methods to be executed based at least on using a current instruction counter value to select a dispatch table in said plurality of dispatch tables for use with an application program instruction corresponding to said current instruction counter value; and

    means for sending said application program code.

  31. (Previously Presented) The apparatus of claim 30 wherein said means for determining further comprises means for determining the encoding of said plurality of dispatch tables based at least on a relative frequency of instructions in said application program code.

  32. (Original) The apparatus of claim 30 wherein said means for determining further comprises filtering said plurality of dispatch tables to flatten the frequency distribution of instructions over said transformed application program code.

  33. (Original) The apparatus of claim 30 wherein

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said apparatus further comprises, means for
applying a cryptographic process to said application
program code together with a cryptographic key to
create an encrypted obfuscated application program in
response to said transforming; and

said means for sending comprises means for sending
said encrypted obfuscated application program.

34.   (Currently Amended)   An apparatus for executing an
obfuscated application program, the apparatus comprising a
user device configured to:

receive an obfuscated application program, said
obfuscated application program comprising at least one
instruction opcode value encoded using one of a
plurality of instruction set opcode value encoding
schemes;

receive an application program instruction
corresponding to a current instruction counter value;

select an instruction dispatch table based at
least on said current instruction counter value; and

execute said application program instruction using
said selected instruction dispatch table to obtain a
reference to an instruction implementation method
corresponding to ~~an~~the opcode value of ~~the~~ said
application program instruction.

35.   (Previously Presented)   The apparatus of claim 34,
said user device further configured to:

determine whether there is another application
program instruction to be executed;

advance said current instruction counter if there
is another application program instruction to be
executed; and

repeat said receiving said application program
instruction, said selecting and said executing after
said advancing.

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36.   (Previously Presented)   The apparatus of claim 34 wherein said user device is further configured to:
        perform modulo-n arithmetic operation on said current instruction counter value, where n is the number of dispatch tables, each of said dispatch tables associated with a unique number between 0 and n-1; and
        select the instruction dispatch table associated with the result of said modulo-n arithmetic operation.

37.   (Previously Presented)   The apparatus of claim 34 wherein the number of instruction dispatch tables is based at least on a number of instructions in a method of said obfuscated application program.

38.   (Original)   The apparatus of claim 37 wherein said number of instruction dispatch tables is greater than or equal to said number of instructions.

39.   (Original)   The apparatus of claim 38 wherein said number of instruction dispatch tables equals said number of instructions.

40.   (Previously Presented)   The apparatus of claim 34 wherein the number of instruction dispatch tables is based at least on an amount of available memory.

41.   (Previously Presented)   An apparatus for application program obfuscation, the apparatus comprising an application program provider including a processor, and memory, coupled to said processor, having stored therein computer readable instructions wherein upon executing said computer readable instructions on said processor said application program provider is configured to:
        read an application program comprising code;
        determine a plurality of dispatch tables associated with said application program;

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transform said application program into
application program code configured to utilize said
plurality of dispatch tables during application program
execution to determine the location of instruction
implementation methods to be executed based at least on
use of a current instruction counter value to select a
dispatch table in said plurality of dispatch tables for
use with an application program instruction
corresponding to said current instruction counter
value; and
    send said application program code.

42.   (Previously Presented) The apparatus of claim 41
wherein said application program provider is further
configured to determine the encoding of said plurality of
dispatch tables based at least on a relative frequency of
instructions in said application program code.

43.   (Original) The apparatus of claim 41 wherein said
application program provider is further configured to filter
said plurality of dispatch tables to flatten the frequency
distribution of instructions over said transformed
application program code.

44.   (Original) The apparatus of claim 41 wherein
    said application program provider is further
configured to apply a cryptographic process to said
application program code together with a cryptographic
key to create an encrypted obfuscated application
program; and
    said application program provider is further
configured to send said encrypted obfuscated
application program.

45.   (Previously Presented) A data processing system
comprising:
    a processor; and

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memory, coupled to said processor, for storing data for access by an application program being executed on said data processing system, said memory comprising:

a data structure stored in said memory, said data structure including information used by said application program to execute an obfuscated application program on said data processing system, said data structure comprising application program code configured to utilize a plurality of dispatch tables during execution of said obfuscated application program to determine a location of instruction implementation methods to be executed based at least on using a current instruction counter value to select a dispatch table in said plurality of dispatch tables for use with an application program instruction corresponding to said current instruction counter value.

46. (Currently Amended) The data processing system memory of claim 45 wherein said data structure further comprises a cryptographic key and protected data, said protected data encrypted using said cryptographic key.

47. (Currently Amended) The data processing system memory of claim 45 wherein said data structure further comprises an obfuscation descriptor that indicates an obfuscation method used to create said obfuscated application program.

48. (Previously Presented) A data processing system comprising:

a processor; and

memory, coupled to said processor, for storing data for access by an application program being executed on said data processing system, said memory comprising:

a data structure stored in said memory, said data structure including information used by said application program to execute an obfuscated

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application program, said data structure comprising a
plurality of dispatch tables used during execution of
said obfuscated application program to determine a
location of instruction implementation methods to be
executed based at least on using a current instruction
counter value to select a dispatch table in said
plurality of dispatch tables for use with an
application program instruction corresponding to said
current instruction counter value.